PERIODICAL ROOM GENERAL LIBRARY UNIV. OF MICH.
NOV 25 1929

SCIENCE NEWS-LETTER

The Weekly Summary of Current Science

A SCIENCE SERVICE PUBLICATION

$5 a year 15c a copy November 16, 1929

REMOTELY ANCESTRAL?

Tarsier, Feared by Malays, May be Distant Cousin

(See page 298)

Vol. XVI No. 449

Explore Prehistoric Village

Archæology

Slowly but surely the ancient Chumash village site of Muwu, 50 miles northwest of Los Angeles, is yielding secrets of primitive American life to the trowels and shovels of the Los Angeles Museum exploring party, headed by Arthur Woodward, curator of history.

Aided by Dr. Charles Van Bergen of New York, the Los Angeles Museum is excavating the huge heap or kitchen midden upon which the thatched houses of the people of Muwu once stood. Trenches are slowly dug through the deposits and the earth is removed with trowels, a foot at a time. Each day records the discovery of tools, weapons, and ornaments belonging to the villagers who lived upon the spot when the Spaniards first discovered it 387 years ago.

Several floors of the ancient houses have been laid bare, with their accompanying ring of hearth stones. It has been discovered that some of the houses were partially subterranean, the floor level being more than sixteen inches below the level of the earth. In the debris and on the floors many artifacts have been discovered.

These people were great hunters and fishers at the time the Spaniards first encountered them, but apparently in the very early times they depended almost entirely upon shellfish and small fish for their sustenance. Great quantities of sea and land mammal, bird and large fish bones were encountered in the first two feet of excavations. But the bulk of the debris so far found below this two-foot level has been almost entirely pecten, cockle, clam, abalone, moon and other shells.

Numbers of bone barbs of fishhooks are found, many of them retaining the imprints of the cordage in the tar that bound them to their wooden or bone shanks. There are also shell fishhooks of circular shape.

The implements recovered have been mostly of bone. Well-fashioned awls made of bird bones and deer bones are plentiful. One extra-fine specimen has the bitumen haft still in place. Several stone knife and scraper blades have been brought to light with the tar with which they were cemented into the wooden hafts still clinging to the butts of the blades.

Red paint is scattered through the debris and several shell paint cups have been found with traces of the paint in them. Tar lumps with which the ancient ones payed the seams of their plank canoes, hafted their tools and weapons, made watertight their baskets and inlaid their bone, stone and shell jewelry are plentiful. Abalone shell containers for the tar are discovered, just as they were brought from the beach. One lump of tar still had in it the tar stick which some Chumash seaman had evidently dropped after caulking the seams of his brilliantly painted canoe.

Arrowheads, scrapers and stone drills are of varying sizes and materials. Not a few of the arrowheads are made of obsidian, trade material that had been brought in from the north or from the Imperial Valley to the southeast. Most of the points are thin and well made.

Beads of shell and bone are scattered loosely in the shell and earth. Some are abalone and well formed, others are olivella.

Charred fragments of tarred basketry turn up now and again and numerous single small round tarred stones, used by the women in waterproofing their baskets, have been found. The method employed was this: the round stones, about the size of tennis balls or smaller, were heated in a fire, then lifted out, presumably with wooden tongs, and dropped into a basket containing small lumps of tar. When the basket was rotated rapidly, the tar melted by the hot stones spread over the interior of the basket and was distributed evenly by the constantly moving pebbles.

Two small fragments of rude pottery have been discovered and those sherds are an enigma. In the first place, pottery was not supposed to have been made by the Chumash; secondly, the fragments are not the typical Diegueno, Luiseno, Cupa or Cahuilla sherds and they are not Spanish. Where they came from, who made them, is a mystery at the present time. They are plain, unpainted, unslipped reddish sherds. The fragments are from different vessels.

Science News-Letter, November 16, 1929

In This Issue

Germ-laden *fashions*, p. 299—Unpopular *stowaways*, p. 301—The race for air *safety*, p. 303—A strange *angel*, p. 304—Key to the *past*, p. 305—World's worst *firebug*, p. 305—Nobel prize *award*, p. 306—How to *gamble*, p. 307—Veteran *tree*, p. 309—Archæological *liquor sampler*, p. 309—New *books*, p. 311.

Remotely Ancestral?

Zoology

The Spectral Tarsier, illustrated on our cover this week, is one of the most interesting and at the same time least known of the primitive primates. If man's ancestry is not to be traced to a union with the great-ape stock in comparatively recent times, as one school of paleontologists is inclined to believe, then it is not impossible that the human race goes back, parallel with the apes, to a lemuroid creature of this general type.

The Tarsier, however, has some special developments which indicate some divergence from a truly primitive condition. Especially notable are the finger pads—sticky discs that enable it to climb smooth surfaces with ease. The animal needs to be a safe and sure climber, for it is nocturnal as well as arboreal in its habits.

It has one characteristic which from the human viewpoint is highly laudable: utter fidelity to its mate. When one is captured its companion is usually taken, too.

Our illustration is reproduced through the courtesy of Charles Hose, an Englishman with a long and notable record of administrative work and natural history observation in the Eastern tropics. He is the author of *Natural Man* and *Fifty Years of Romance*.

Science News-Letter, November 16, 1929

SCIENCE NEWS-LETTER, The Weekly Summary of Current Science. Published by Science Service, Inc., the Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by Watson Davis.

Publication Office, 1918 Harford Ave., Baltimore, Md. Editorial and Executive Office, 21st and B Sts., N. W., Washington, D. C. Address all communications to Washington, D. C. Cable address: Scienserve, Washington.

Entered as second class matter October 1, 1926, at the postoffice at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. Patent Office.

Subscription rate—$5.00 a year postpaid. 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Special reduced subscription rates are available to members of the American Association for the Advancement of Science.

In requesting change of address, please give old as well as new address.

Advertising rates furnished on application.

Copyright, 1929, by Science Service, Inc. Republication of any portion of the SCIENCE NEWS-LETTER is strictly prohibited since it is distributed for personal, school, club or library use only. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service, details and samples of which will be gladly sent on request.

New Dress Styles Draw Censure

"An unmitigated evil", "unhealthful", "deplorable", "unfortunate" are some of the comments of leading physicians when asked by Science Service to give their opinions of the newest styles of women's dress. These doctors have considered the probable effect on women's health of a return to dress styles of an earlier age. They agree that woman today is healthier than she was in the days of tight-fitting corsets and long, sweeping dresses.

Recalling the long full skirts worn 20 years ago, these physicians also recalled the germ-laden clouds of dust and dried dirt that these skirts raised when women walked along the streets. The trailing skirt was considered a menace to the woman's own health and to that of others about her.

These physicians remembered, too, the tightly-corseted figure of some years ago. They remembered how the liver and spleen were pushed up out of their normal, proper place in the body, and the intestines crowded down by the tight lacing necessary to achieve a "wasp waist".

Of course, the newest dresses are not wasp-waisted, and street dresses do not yet sweep the ground—far from it. However, many forward-looking persons are asking whether the latest fashion of longer skirts, form-fitted dresses and corsets will stop where it is, or whether it will not swing all the way back to the extremes of the gay nineties and the early nineteen hundreds.

Long, full skirts, even if they do not reach the ground, and corsets, no matter how loosely fitting, are hampering to physical activity. Some physicians see harm enough in the new clothes if they do no more than keep women from engaging in the healthful athletic activities which have kept them out in the fresh air and sunlight and given them new health and endurance in the years since the World War. Hampering garments also would make women less agile in dodging the present-day swiftly moving vehicles, and might prove an added accident hazard to the great numbers of women now engaged in industrial operations.

Some leaders of the medical profession believe that with woman's lately acquired physical freedom has come a greater freedom of mind and spirit. The modern woman will probably refuse to be a "slave to fashion" and will insist on the dress styles in which she has found greatest comfort, freedom of movement, and, perhaps, greatest health.

THE DESCENT OF THE FROCK: Will it go to the germ-catching lengths that the Gibson Girl wore a quarter-century ago? Physicians and public health workers hope it will not!

Science News-Letter, November 16, 1929

Unhealthful Change

Hygiene

By Dr. Malcolm L. Harris, president, American Medical Association:

I think the newest fashion in women's tight-fitting dresses and corsets an unfortunate and unhealthful change. Long, full skirts for street wear are unhygienic. The loosely clad athletic woman had more freedom of movement; she was more graceful, healthier, and had more endurance than the pre-war type of woman.

Science News-Letter, November 16, 1929

Curtailment of Activities

Hygiene

By Dr. William Gerry Morgan, president-elect, American Medical Association:

Whereas, a few more inches added to the length of the flapper type of skirt might be more pleasing to the eye and somewhat less suggestive to the masculine mind, yet a return to the pre-war styles of tight corsets, high waistline, long full-flowing skirts and drooping hats would be regrettable in the extreme and would in all probability result in curtailment of some of the health-giving athletic activities which women have been benefiting by during the past few years.

Since the more sane type of clothing worn by women at the present time there has been a very striking decrease in physical defects such as misplaced abdominal vicera with weakened and atonic muscles of the trunk, notably of the abdomen, and fewer postural defects. Lung capacity has been increased and lung activity has become more nearly normal in the average young woman. There has been a marked improvement in circulation with a corresponding improvement in the color and texture of the skin, with a marked lessening of the necessity for the use of the rouge pot and powder pot.

Science News-Letter, November 16, 1929

Styles Will Continue

Hygiene

By Dr. Hugh S. Cumming, Surgeon-General, U. S. Public Health Service:

A reason for the late styles of short, loose-fitting clothes for women lay in the greater activity women have engaged in of late years. This reason still exists, hence the styles will probably continue to exist.

Without presuming to forecast fashions in women's clothing, I think it improbable that women will ever go back to the tight corsets of the past. Room around the hips and abdomen is necessary for the present activities women engage in. At that, as far as the chest is concerned, the old-fashioned corsets were better than the tight brassieres (*Turn to next page*)

New Dress Styles Draw Censure of Physicians—*Continued*

women have worn more recently.

For the last two or three years women's clothing has been very sensible, generally speaking, although in some parts of the country skirts have been a little too short from the standpoint of looks. Longer skirts, especially for evening wear, I consider very graceful, but on the other hand, skirts that sweep the ground would be unhealthful for wear on the streets and in shops and offices.

Women's close-fitting hats of the last few years are sensible if they are not worn too tight. I cannot see that the wide hat will become very popular. Wide hats don't go with airplanes and autos.

Science News-Letter, November 16, 1929

Both Good and Bad

Hygiene

By Dr. Herman N. Bundesen, past president, American Public Health Association:

The return to the wearing of long, tight-fitting dresses with trains, corsets, and large drooping hats has a few good features, as well as several bad ones.

Concerning the corsets, they cause pressure or constriction, and block the flow of blood through the veins. If the wrong kind of corset is worn, it will also cause pressure on the internal organs of the abdomen, and will interfere, to some extent, with normal breathing. On the other hand, in some instances, a certain type of corset is helpful in lending support to the abdominal muscles when they are somewhat lax. However, exercise of these muscles is probably of more benefit than the wearing of an artificial support.

There are certain individuals who cannot stand exposure to cold, and these people catch cold easily. Such persons would benefit by the long dresses. On the other hand, most normal individuals, who gradually harden themselves to the changes in the weather, build up their strength and resistance to infection.

Of course, long skirts, which drag on the floor or ground, are unhygienic. They also interfere with freedom of movement, while large hats obstruct the vision, as well as prohibit the rays of sunshine from striking the face. As a result, the long skirts and large hats may lead to more accidents, while the cutting off of the sun's rays interferes directly with good health.

The freedom of movement given by the clothing worn by women following the war led to better health. As a general rule, the scantily clad, athletic woman is healthier than was the prewar type.

It is probable that the change in styles should be looked on with some disfavor. The ideal clothing for women should be comfortable and should not interfere with the freedom of movement. At the same time, sufficient clothing should be worn to offer protection against the weather.

Science News-Letter, November 16, 1929

Present Nearly Ideal

Hygiene

By Dr. Alice Hamilton, assistant professor of Industrial Medicine, Harvard Medical School:

Regarding the recent attempt to bring back old-fashioned forms of dressing for women, if the change means a return to close-fitting corsets, small waists, and long, full skirts, the effect can only be very deplorable. This is especially true as affecting the health, comfort and safety of working women.

Accidents will be more frequent if skirts are long and full, while tightly fitting waists and increased weight of skirts will hamper free use of the body and make work much harder and more uncomfortable.

The present mode of dressing (not the present style of shoes) is nearly ideal for factory women, while they are indoors, for the light-weight, scanty dresses, loosely fitting and often sleeveless, give no chance for machinery to catch and cause accidents, do not cause tripping, allow full play for muscles and prevent much of the discomfort of work in hot rooms.

It may well be said that these clothes are insufficient protection against cold weather, but the newer fashion would not remedy that.

The change seems to me to be an unmitigated evil, a step back to a more ignorant and sillier age.

Science News-Letter, November 16, 1929

Women Won't Submit

Hygiene

By Dr. Joseph Colt Bloodgood, Johns Hopkins Hospital and Medical School:

I doubt if any change in dress which American women would submit to would have any effect on health. The basic facts which are best for the preservation of health have little to do with dress.

It is also my opinion that American women now freed from the old type of dressing will not submit to any change which is uncomfortable. The healthy, intelligent women will dictate their own style of clothes.

Science News-Letter, November 16, 1929

Women Better Physically

Hygiene

By Dr. Paul E. Brooks, Deputy Commissioner of Health, State of New York.

For several years now there has been a systematic effort to introduce styles which would bring back the long dresses and long hair.

Twenty or thirty years ago women were wearing heavy clothes of a sort that interfered with circulation in vital organs, and practically eliminated any possibility of deep breathing or freedom of muscular action. My father, a conservative physician, expressed the feeling that the women were to be congratulated when they made a very radical move some thirty years ago and shortened to ankle length the skirts which had previously been wiping up germ-laden dust and dirt from streets and floors.

Since that time there have been much more radical changes, which have come about gradually. Tight corsets have almost disappeared; clothing is light and no longer burdensome; arms, legs and breathing organs are free to function as they were designed to function.

It is my belief that women, as a class, are in better physical condition today, partly if not wholly as a result of the freedom of action resulting from this change, and in the opinion of certain competent observers, they also look better.

In any event, women recently have been displaying an independence and judgment, in their refusal to allow themselves to be stampeded into accepting styles that they don't want, which entitles them to still more of our admiration and respect, if that is possible. It is my hope that their independence will not weaken and that they will continue to hold out for clothes that not only contribute to attractive appearance but favor health, happiness and longevity.

Science News-Letter, November 16, 1929

Small parachutes are now used by the Army Air Corps in order to land safely the expensive gliders used in target practice.

Death Rides the International Airlines

Public Health

By Jane Stafford

Dangerous stowaways may ride on the great aircraft that link continents together. Invisible creatures that would add not an ounce to an airship's weight can hide where the cleverest officer could not find them. But they could bring disaster and death to sweep across a country. Disease germs lurking in the bodies of passengers or crew are the deadliest stowaways these great air liners can carry.

The danger from these stowaways is not limited to passengers and crews on airship or airplane. It may be shared by a whole nation. Germs of diseases that destroy animals, plants and men may be brought by air, as well as by land or water. We have learned to guard against these germs when they come by land or sea, but air travel brings fresh problems of disease prevention. With the plague-ridden Orient and the yellow fever centers of South America only a few hours or days away, public health officers must find new ways to protect our country from the ills that scourged the world a century ago. Now held in check, they await a chance to gain the upper hand again.

The new England-to-India air route and the probable dirigible lines from the Orient to America have tremendous possibilities in the way of disease spreading. The running time from London to India has been cut from 21 to 6 days and the Graf Zeppelin made the distance from China to Los Angeles in 2½ days. Medical and health authorities have not forgotten that the plagues that swept over Europe in the Middle Ages and later centuries had their origin in the East, although the traveling time was far greater than 21 days. Will the same plagues return again? Or will science find a way to free this newest kind of transportation from the horrible fate of furnishing free rides for deadly germs?

Aerial boarding stations for quarantine officers are already foreseen by one air-minded public health officer. Instead of boarding incoming liners from a tug, the quarantine officer of the future might fly out and board the plane or dirigible in mid-air, via a rope ladder. Should he find evidence of a quarantinable disease aboard, arrangements might be made for keeping the airship in quarantine at 500 to 1,000 feet above the earth, or sending it to a special quarantine detention field.

Whether or not they need to become aerial stunt performers, the quarantine officers of the future will have to be real Sherlock Holmes' of health, able to detect partly-developed disease germs hiding in the bodies of well men. The greatest danger of disease entering this country by air lies in the fact that people infected with the germs of cholera, plague, and other major quarantinable diseases do not show any signs of illness until after the germs have been in their bodies for a number of days. But during this period, before the presence of the disease is even suspected, the infected persons are constantly giving off germs in their secretions, breath or body wastes. One such person mingling freely with the population can start a widespread epidemic. The speed of air travel helps the disease germs mightily. They can now cover great distances and get a chance to spread to large numbers of people before they are detected.

Two and a half days from China to Los Angeles by air will probably be the new schedule. It takes from three to five days for the germ of cholera, for instance, to develop in the human body. This means a man may board a plane in China or Japan perfectly well, but harboring the germ of cholera in his body without knowing it. Two and a half days later he steps out at the Los Angeles airport, still without showing any signs of illness, probably without feeling ill. Within the next twenty-four hours he visits hotels, restaurants, shops, private homes; he rides in trolley, bus or train. The day after his arrival, or maybe two or three days after, he develops a virulent case of Asiatic cholera. And from three to five days later the thousands of persons with whom he came in contact after his arrival are suffering from more or less severe attacks of the same horrible illness. The entire community, perhaps the entire country would then be in the grip of an epidemic of this dread disease.

Had this same man traveled by boat, taking from 17 to 21 days for the voyage, he would have developed the disease before the ship reached port. He could have been isolated from the other passengers and the entire ship could have been quarantined until such time as it was safe for the passengers and crew to mingle with the general population without danger of spreading cholera among them.

How to prevent air travel from becoming a new and potent spreader of disease is a problem that public health and quarantine officers now face. Diseases have always followed lines of travel. When the travel is slow, there is time for the disease to flare up and burn itself out en route, before the next large community is reached. But when the rate of travel becomes faster than the rate of development of the germs, there is no safety zone to protect communities and countries from each other's plagues.

At present quarantine regulations in this country are directed against cholera, yellow fever, typhus fever, plague, small-pox and leprosy. Ships from abroad may call only at designated ports of entry. There quarantine officers of the U. S. Public Health Service are stationed to examine the ship's passengers and crews and cargo if necessary, and to receive from the captain the ship's bill of health, which states what diseases, if any, have occurred during the voyage or were prevalent at the last port of call, and when the ship was last fumigated. These precautions serve to protect us from outbreaks of the major disease plagues of the world. But when air travel becomes general, such measures may not be sufficient.

Without going to such extravagant lengths as aerial boarding stations, the U. S. Public Health Service has already detailed quarantine officers expressly for the inspection of airships at the landing field, before the passengers or crew debark. Such officers inspected the Graf Zeppelin on her arrivals at Lakehurst and Los Angeles. Plans for new airports now include provision for quarantine stations. The number of airports at any one locality is being limited, as are ports of entry for ships, in order to avoid the necessity for several quarantine, customs and immigration officers in one small area. Cities which now have quarantine stations for airships are Buffalo, Albany, Los Angeles, Brownsville, Texas; West Palm Beach, Miami, San Diego, San Juan, P. R.; Nogales, Arizona; El Paso, Newport, Vt.; Key West, St. Paul, Newark, N. J.; Detroit, and Seattle, which has two.

Other countries are making similar arrangements for inspection of air transports. The latest Canadian regulations provide that: "Aircraft arriving in Canada from foreign or overseas countries, (*Turn to next page*)

Death Rides the International Airlines—*Continued*

subject to the same exemptions as are set forth in Section 13 of these regulations regarding ocean-going vessels, are required to undergo quarantine inspection on arrival before being allowed to make customs entry. All aircraft arriving in Canada from ports or places infected with quarantinable disease are required at time of quarantine to present bills of health in accordance with the requirements of Section 10 of these regulations." Unless operating exclusively between ports of the United States and ports of Canada, aircraft are subject to quarantine inspection on arrival in Canada before being allowed to make customs entry. The regulations are similar to those applicable to ocean vessels.

The classic example of the transmission of disease by air occurred in England early in the history of air travel. A British officer, flying home on leave, brought with him a dog which he had picked up in the trenches and made his pet. The dog developed rabies shortly after arriving in England, and through him an epidemic of the disease ravaged English dogdom. This marked the first appearance of the frightful disease in England for 16 years. Rabies attacks men as well as dogs, the disease being transmitted by the bite of mad or rabid dogs. Dogs may not be brought into England now until after they have been kept for a number of months in quarantine, where they are watched for signs of rabies, distemper and other diseases.

At present British health officials are worried over the development of the air and water route between Africa and South America, and the possibility of air lines across Africa from west to east. The introduction of yellow fever into India is the specter that gives these officials sleepless nights. South America, particularly Brazil, is the greatest yellow fever center in the world. The new route, combining planes and fast steamers, goes directly from Pernambuco, Brazil, where yellow fever is constantly present, to Dakar, in French West Africa, and thence on across northern Africa to Spain and France. The danger to these countries of importing yellow fever is considerable, but the greatest danger is that yellow fever may spread across Africa to the east and then make the short jump to India. The disease has never yet occurred there, but the mosquito in whose body the yellow fever germ passes one stage of its development is found abundantly all over India. Her millions of people, who have never been exposed to yellow fever, are undoubtedly highly susceptible to it. One case of yellow fever brought into India would cause an overwhelming catastrophe. An epidemic has just been conquered at Dakar, in Africa. Using many hundreds of men and at a cost of $20,000, Dakar was completely freed of mosquitoes. French Colonial officials are hoping to make this condition permanent, which would greatly lessen the danger of spreading yellow fever to Europe and India by air.

The situation in our own country is not so much better. For a quarter of a century we have been free of yellow fever, and rigid quarantine inspection and enforcement have kept this highly fatal disease out. But air travel has cut the distance between the United States and Central and South America to a matter of hours, while yellow fever takes five days to develop. New quarantine regulations will be required to protect us from this disease in the future. We cannot count on cases developing on the journey, and quarantine officers will need some way of determining which of a company of well men is going to develop yellow fever, or cholera, or plague, or typhus fever, if the airship has come from the East or the Near East, instead of from South America.

The terrors of a yellow fever or cholera epidemic are best remembered by the older generation of Americans, but influenza epidemics tolling hundreds of thousands of deaths are familiar to us all. The disease spreads like wildfire, when aided only by such ordinary means of travel as trains and boats. When aircraft becomes a factor, the result will be even more devastating.

The list of quarantinable diseases may be increased when air travel becomes more general. Scarlet fever, diphtheria, and epidemic spinal meningitis may have to be guarded against, as well as smallpox, yellow fever and cholera. At present these diseases, while serious and frequently epidemic, have not presented any great problem for quarantine officers. They are fairly universal and there is not much more chance of an epidemic being started by a foreigner than by a native. On the other hand, many inaccessible parts of the world are being opened up by the airship. In these places scarlet fever and similar diseases are rare, and the danger lies in starting an epidemic in a highly susceptible group of natives by germs carried out by Americans or Europeans.

But it is not only the ills of man that may be spread by the world-wide development of aircraft travel. Our domestic animals have their own diseases, and there is a distinct possibility that these also may come via the air. Of course, only small animals possibly infected with diseases could come by plane—dogs and cats and canaries and prize chickens. But not all the diseases of animals require living carriers. Hoof-and-mouth disease of livestock, for example, lurks in the soil where afflicted cattle have pastured. Suppose some plane should run over such soil—there are wide areas in Europe thus accursed—and pick up just enough to plant the virus in an American field when it landed on this side? Fantastic—yes; but not impossible.

Similarly, the bacteria or fungus spores that cause the thousand-and-one diseases of crop plants, fruits and flowers are capable of being carried by plane. A wilted flower carelessly tossed overboard may be more destructive than a TNT bomb. One of the conjectures advanced to account for the sudden and mysterious appearance of the Mediterranean fruit fly in Florida last spring is that an airplane passenger threw away an orange he found to be "wormy," not knowing that the supposed worms were really the larvae of the dreaded insect pest.

And if the plane can be used in innocence and ignorance with such sinister results, what is to prevent its being used by deliberate scofflaws? It is hard enough to enforce the interstate quarantine against the European corn borer now, even with officers on all roads to stop automobiles and make sure no sweet corn or other possible carrier crosses the deadline.

It is becoming increasingly evident that our old system of seeking regional safety against diseases of man, beast and plant, against insect pests and noxious weeds by means of blockades and quarantines is bound to break down before the onrush of air traffic. We shall have to devise entirely new methods of defense against these dangers, as we have had to devise new weapons to meet the threat of military airships and airplanes.

Safety Aim of Guggenheim Contest

Aviation

By Thomas Carroll

Thomas Carroll was formerly chief test pilot for the National Advisory Committee for Aeronautics. He is one of the pilots who is flying the contest entries in the tests at Mitchel Field.

To prove to the public that airplanes can be made safe is the object of the Daniel Guggenheim Safe Aircraft competition sponsored by the Daniel Guggenheim Fund for the Promotion of Aeronautics. A demonstration of aircraft, striving to fulfil rigid specifications for aircraft that can be regarded as safe, was conceived as the method of stimulating progressive design on the part of the manufacturers and confidence on the part of the public. Prizes totalling $150,000 made the competiton financially attractive. It had been humorously expressed that a safe airplane was like a good Indian. It was the task of the competition to prove differently.

The delineation of what might be considered a safe airplane, a very difficult task, was accomplished by laying out most comprehensive and intelligent specifications.

A safe aircraft which was not of obvious usefulness would not be a step forward. The first specification provided that the craft under test should be useful. To demonstrate utility, it was specified that it must carry a useful load of at least five pounds per horsepower of its engine, and that it must further satisfy a speed requirement of carrying at least a pilot and one passenger at a minimum high speed of 110 miles per hour. It must also demonstrate its ability to climb in order to get in and out of fields, and the minimum requirement in this regard was that it should be able to climb at least 400 feet per minute from the ground.

With these as basic requirements, safety tests are next applied. The ability to fly under full control at low speeds was considered of absolute importance and therefore the figure of 35 miles per hour was set as low speed maximum for flight under power, and 38 miles per hour as the low maximum gliding speed without power.

The aircraft must also be capable of coming to rest not more than 100 feet from the point at which it first met the ground, and in taking off, it must be able to leave the ground in a run totalling not more than 300 feet. Incidentally, it must be capable of taking off in that fashion and clearing an obstruction of 35 feet in height, located at not more than 200 feet from the end of the landing run prescribed.

Its stability and maneuverability are also required to be demonstrated. It must be stable in nearly all ordinary conditions of flight and maneuverability. As a final point, if through any misplacement of the controls by the pilot, or from any extraneous cause, the airplane should be thrown into an unusual position, it must be capable of being brought out of it by a skillful pilot without more than a 250 foot loss of altitude. Without any attention of the pilot, through its own inherent stability, the plane must be able to recover itself in not more than 500 feet.

There is no limitation upon the means by which the desired performance can be attained. The design may be either evolutionary or revolutionary. It may be accomplished by a skillful refinement and improvement of airplanes as we know them. On the other hand, it is entirely permissible, so long as the aircraft is heavier than air, to attain the ends by a radical departure from any generally used aircraft.

Practically the entire entry list of the Daniel Guggenheim Safe Aircraft Competition was submitted within two or three days of the closing of the contest. When this contest to develop and discover safer airplanes was announced in 1927, it was little expected that no serious competitors would be received for test prior to the final week of the contest.

There seems to have been a reluctance on the part of the designers, both foreign and domestic, to submit half-hatched ideas in this somewhat revolutionary aeronautical contest. It is on that account that entries have been withheld, and only at this late date is it possible to give a list of the competitors.

Formal entry of twenty-seven various types of aircraft has been made during the past two years, but these entries merely filled out the form. All but less than a dozen have at this time either withdrawn or have failed to complete their entry by submitting an airplane for test.

Neither could it have been foreseen that the last two or three days of the competition would be fog-bound, rainy days, with flying a practical impossibility, which has necessitated several of the entries being brought in by truck.

At the close of the competition the complete entry list appears to comprise the Burnelli, the Command-aire, the Cunningham-Hall, the Curtiss, the Fleet, Handley Page, the Leigh Safety Wing (which is a modified Brunner & Winkle Bird), the Schroeder Wentworth and the Taylor. The Alfaro and the stock Brunner & Winkle Bird were submitted "in person," but were withdrawn.

These airplanes, together with the large number which have been worked out but have failed of actual entry, have at least developed a tremendous amount of thought in the industry toward the goal of safer aircraft. From this standpoint the competition can be considered a complete success.

Some of the entries have already been flown, and their performances are so completely different from what airplanes were when the contest was conceived over two years ago that the object of the competition, which is to make flying safer, is sure to be accomplished.

Handley Page

The first airplane to be received in a condition which would permit of its being tested in the Guggenheim Safe Aircraft Competition, was the Handley Page entry, of British origin.

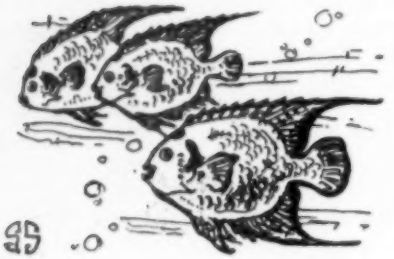
This little airplane does not look to the lay eye much different from many planes which are customarily seen in the air. It is a small, two-seater biplane, equipped with a five-cylinder Armstrong Sidley engine. To all outward appearances it is quite normal.

It does, however, fulfil the minimum requirements of being capable of carrying the specified load at the minimum top speed of 110 miles per hour, or better. Very complete and intelligent application, however, has been made to the problem of slow speed, and this has been accomplished by a combination of the Handley Page slot, together with so-called flap gears.

The slot is formed by the moving forward of a small wing, which normally, in the high-speed condition, lies flush upon the surface of the entering edge of the main wing. The flap is a movable portion of the rear of the wing hinged similarly to an aileron, and the slot and flap are geared together in such a fashion that the movement of one actuates the (*Turn to next page*)

Nature Ramblings

By Frank Thone



Angel-Fish

The calm, warm water over the coral reefs that shelter tropical atolls and lagoons must be for the creatures that can breathe it a fair equivalent of the calm, warm, languorous air that washes over the islands above. These isles of the southern seas are as near as the fallen sons of Adam shall ever see of the earthly paradise. At least, so say novelists, writers of steamship circulars, and other romancers.

For aught we know, they may be telling the truth. One may be excused, perhaps, for preferring to substitute tropical birds for dusky but often overstuffed maidens, in the role of angels in this paradise. And for the twin paradise beneath the surface of the mirrored waters, need we seek beyond the angel-fish?

An angel-fish is just as useless as a humming-bird or a trogon—and just as much of an unceasing delight to look upon. School after school of them will flash beside your boat, or even better, before your diving helmet if you go down to visit them. They are not swift swimmers, but the deliberate grace of their movements makes you ready to believe the fine old legends of angels that dance on the clouds or among the stars.

There are many species of them, far more than the traditional seven choirs of angels allowed by Hebrew and Christian theology. Though their body-shapes all follow more or less the same pattern, their color designs are varied and striking. Some of them are so daring and different that one might well imagine the Creator as throwing down a thoroughly discomfiting challenge to even the most modern of artists and designers.

Guggenheim Contest Entries—*Continued*

other. In flight, as a high angle of attack is reached, the air forces upon the forward part of the wing are such as to displace the small wing forward, leaving an opening between it and the main wing through which the flow of air is actuated. Then being connected with the flap, the forward opening of the slot airfoil automatically moves the flap in a downward direction, increasing the camber and the effectual angle of attack.

The application of this slot and flap changes the lift factor of the whole wing to an extent which permits of its being flown at a very much greater angle of attack than with ordinary wings, and a greater lifting force is developed.

The airplane is equipped with wheel brakes, which appear to be a necessity to cope with the short landing requirements. It would hardly call for comment if they were upon an American machine, but the use of wheel brakes upon British planes is only now becoming standard.

The preliminary performances of the Handley Page entry have demonstrated that it must be considered a very serious contender in the competition, and the results of the actual tests will be most interesting not alone to the aeronautical industry, but to the public as well.

Curtiss "Tanager"

The "Tanager," which has arrived at Mitchel Field to fly in the Daniel Guggenheim Safe Aircraft Competition, is the Curtiss entry and was constructed at Garden City, Long Island.

Prior to its submission it was tested by the Curtiss test pilot, Paul Boyd, whose terse comment upon its performance is: "We believe that it will meet the requirements of the competition."

The airplane is of cabin type, carrying a pilot and passenger in tandem within the enclosure. It is a rather large biplane, equipped with the Curtiss "Challenger" engine, the engine which recently carried O'Brien and Jackson to the world's endurance record.

The wings are equipped with a modification of the Handley Page slot. In addition, flaps, the hinged rear portion of the wings, are independently and manually operated, allowing their position to be fixed by means of a chain gear in any position at the will of the pilot.

The landing gear is the familiar combination of rubber in compression, and a long travel oleo gear which permits of a landing gear travel of more than one foot. It is, of course, equipped with wheel brakes operated by individual pedal gear.

An interesting innovation in its landing gear design is that the travel of the shock absorbers is restricted in taking off in order to assure the landing gear's leaving the ground in the shortest possible distance, rather than trailing along the ground due to extension as the load is reduced. The gear is placed in full action before landing in order that the full use of the shock absorber may be had.

A most unusual and interesting feature is the full floating ailerons. These are of the wing tip design, similar in many ways to the old Curtiss interplane ailerons which were placed, in that earlier case, between the wings, but which in this particular application, are placed at the tips of the lower wings. These are floating, and in the free position, trail at a zero angle with the relative wind. They are, however, independently operated in the usual aileron fashion around this trailing position. An aileron control is provided which is entirely independent of the wings, and which, whether the wings might be stalled or not, are never in a stalling condition, though always being displaced from the zero angle of attack position for lateral control. This provides an unusual control at high angles of attack and low speeds.

The fineness of the design and the power of the engine assures a satisfactory high speed performance. The Tanager, whether it wins the competion or not, will be certain to put up a most excellent showing toward the ideal of a safe and simple airplane.

American mosquito-eating fish are to be introduced into Syria.

There is less than one per cent. of illiteracy in Scandinavia.

It is likely that dogs suffer more from decayed teeth than men do.

The ancient Egyptians first acquired silver and iron from the Hittites.

The mountain beaver of the Pacific coast is not a true beaver, and resembles in size and appearance a tailless muskrat.

Modern Mayas May Explain Ancestors

Archæology—Eugenics

Why the glory of the Mayan civilization in prehistoric America has never been revived by any Indian descendants of that superior group may yet be understood, by studying the living Mayas of Mexico. This is the belief of Dr. H. H. Laughlin, eugenicist, of the Carnegie Institution of Washington.

Ruins of stone cities in the jungles of Guatemala and Yucatan are mysterious evidence of the artistic skill and organized effort once put forth by this Indian line. Stone tablets show that their astronomer-priests reckoned time by a calendar more accurate than any possessed by Europeans of the same eras. When the Spaniards came to America, these Mayas had been in conflict with Aztec and other Mexican tribes and had begun to slip back culturally.

Archæologists have wondered why this fading of culture occurred and why none of the Indians who claim descent from the superior Mayan culture have displayed the old artistry or intellectual power. Dr. Laughlin suggests that eugenics has a service to render to archæology in solving this problem.

A check should first be made, he proposes, to determine whether there are really any living Mayas who may be taken as lineal and uncrossed descendants of the ancient Mayas. If these exist, then the abilities and traits of their ancestors should be analyzed on the basis of their accomplishments, and the modern Mayas should be tested to see whether they have inherited any capacities along the lines that made their ancestors great. If they have totally lost this inheritance, the decline of the Mayan culture may be explained on the grounds of racial degeneracy, and that alone would be a sufficient basic cause, Dr. Laughlin states.

"It is possible for subsequent generations to be lineal descendants of superior stocks and still to be quite different from such ancestors in certain qualities, or even to be degenerate in hereditary capacities," he has explained.

In population groups where superior families have few children and inferior families have many children, surprising changes occur in five generations. An inferior group which comprises 10 per cent. of a population will increase until it makes up 90 per cent. if it averages four children to a family; a superior group comprising 60 per cent. of the population will at the same time dwindle to less than 1 per cent. of the population if it averages one child to a family; and a 30 per cent. middle group with two children to a family will be reduced to about 8 per cent. of the population. If such a change took place in Mayan communities their downward tendency can be understood.

If it can be shown that no such racial degeneracy overtook these Indians, breeding out the abilities essential to their success, then that old question at least will be settled, and the search for the answer to the Mayan riddle can be shifted with more confidence to the environmental factors.

The Mayas offer a peculiarly fine opportunity for studying the part played by heredity and environment in a great racial cycle, Dr. Laughlin shows, because it is doubtful if any other country claims to have uncultured inhabitants who are the unmixed and lineal descendants of the men and women who developed and sustained one of the world's high cultures.

Science News-Letter, November 16, 1929

Confer on Spontaneous Combustion

Chemistry

An investigation of the world's worst uncaught "firebug" looms. A conference to discuss the facts, clues, and unknown quantities in the case regarding spontaneous combustion was held in Washington by the National Fire Protection Association in cooperation with the U. S. Departments of Agriculture and Commerce, on November 14 and 15.

When fire gets an insidious start in a dry, well-managed place where no human being has been wandering about with matches or other fire-making materials, the usual explanation is spontaneous heating and ignition, said David J. Price, chief of the division of chemical engineering at the Department of Agriculture, in outlining the situation faced by the conference. But the usual explanation, he continued, is almost as unsatisfactory as writing down a mystery on a police blotter under the heading "unsolved", for the process which sets up spontaneous heating and ignition is still unknown.

The undetected process manages to start $20,000,000 worth of fires each year, according to insurance figures, and there is $200,000,000 more lost in fires vaguely attributed to causes unknown.

The conference is not to be limited to a few experts, Mr. Price emphasized. All who can shed light on the case or who are interested in the problem in any way are invited. The meeting will attract representatives of the railroads, marine transportation lines, manufacturing industries, the sugar industry, feed and cereal manufacturers, producers of hemp and other combustile fibers and of animal and vegetable oils, the paint and varnish industry, the fertilizer industry, and insurance companies.

The problem is to discover the laws of nature under which the destructive process operates and then to prevent the circumstances which make the process possible. A prominent government chemist, Dr. Charles A. Browne, holds the theory that the process is both bacterial and chemical.

Describing conditions in a haystack which catches fire, he points out that first of all bacterial action causes fermentation. This heats the hay, but not enough to cause ignition, for at 150 degrees Fahrenheit the bacterial process is mostly destroyed by heat, and 600 degrees would be necessary for ignition. His theory is that a chemical process enters the situation. The bacteria produce gases, and as the haystack is heating, the gases press out from the centers of chemical activity and form channels in the hay. When a channel reaches the surface of the stack, air rushes in suddenly, and the hot, unsaturated products are oxidized and the temperature rises to such a point that fire is readily produced.

It is hoped that the conference will start action toward an organized study of the causes and conditions that produce these presumably preventable fires, Mr. Price stated.

Science News-Letter, November 16, 1929

Nobel Prize to Eijkman, Hopkins

Medicine

Two men who gave to the world the earliest knowledge of the all-important vitamins, Prof. Christian Eijkman of the University of Utrecht in Holland and Sir Frederick Gowland Hopkins, professor of biochemistry at the University of Cambridge, England, have been awarded the 1929 Nobel Prize in medicine.

Prof. Eijkman was the first man to produce experimentally a disease of dietary origin. In 1889, when director of the hygienic laboratory at Batavia, Dutch East Indies, he succeeded in producing polyneuritis in fowl by feeding them a diet consisting exclusively of completely polished rice. He had previously noted that this disease resembled closely the disease beri-beri occurring in human beings. In both the human and fowl diseases, the nerves show the same degeneration, and the symptoms are very similar. In 1921 Prof. Eijkman was made a foreign associate member of the National Academy of Sciences.

Professor Hopkins, in 1906, first demonstrated that an accessory food substance beside proteins, fats and carbohydrates was necessary for growth, reproduction and maintenance of life in animals. Since then he has done considerable research on the nature of these accessory substances, which we know by the name of vitamins. Professor Hopkins has been called discoverer of the vitamins.

Science News-Letter, November 16, 1929

Between the Ears

Philosophy

HENSHAW WARD, in the *Yale Review*:

If I could detach myself from all prejudice and could view the workings of the human intellect as if I were a supernal creature, I should see that only one definition of knowledge is broad enough to be correct: Knowledge is anything that happens between anybody's ears. I should explain my definition thus to a mortal: "Nobody has ever seen the Holy Ghost or an electron or a newly evolved species of animal; these are concepts that originated inside of craniums and that skeptical eyes cannot see outside of craniums. They are not visible to all eyes alike—as a lighthouse or a corpse is. Yet atoms are knowledge to a large group of intensely logical minds, and holy spirits are knowledge to another large group of deeply perceptive minds, and evolution is knowledge to a third large group of closely reasoning minds. A few capacious brains can accept all three sorts of knowledge; many highly organized brains can accept only one; and there are penetrating brains that discard all three. But every one of these and a thousand other kinds of cranial episodes has to be classed as knowledge. Knowledge is simply what anybody thinks.

That way of expressing the fact would sound satirical or hyperbolical to us mortals. We are all pretty well satisfied with the particular reasonings that appeal to us; we have thought our way through to them; we have analyzed the fallacies in other reasonings; we know that thousands of reliable men see the cases just as we do—so we consider that the false is rather distinctly divided from the true, and go about our business.

Imagine that you are an archangel viewing the antics of human reason from some fourth dimension beyond the galaxies. You see that atomic creatures with two legs and a head are mostly concerned with pride and procreation, but you also see that their minds can reach to your kind of space and time. They are comical in one way, but glorious in another. You have to laugh, but you do not despise. You bend your observation around the corner into three dimensions and down to this fleck of a globe where reason cavorts. Your serene eyes behold the stacks of knowledge: trinities, monisms, vital principles, oversouls, inner lights, scientific observations, dogmas, canons of religion, modes of conduct, methodologies, verifications, mysticisms, humane totalities, inspirations, poetic insights, mathematical divinations, notions of progress and value, rectigradations, epistemologies, measurements, philosophic systems. All these whirlings of the human brain stand out with garish and steady detail to your heavenly consciousness. You perceive them simultaneously and separately, as parts of the chaos that men call "intellectual operations. You perceive that they are as diverse as the species of animals and as inimical to one another as rival organisms in the struggle for existence.

Science News-Letter, November 16, 1929

Drug Book Revised

Pharmacology

Physicians and pharmacists all over the country have been sent score sheets on which to record the popularity of various drugs and remedies which will be considered for admission to the new U. S. Pharmacœpia, to be issued shortly.

The U. S. Pharmacœpia is the collection of formulas for drugs and remedies recognized as standard by doctors and pharmacists of the United States. It is official but has no connection with the Federal Government, being published by authority of the United States Pharmacœpia Convention, a body composed of delegates from national or state associations of physicians and pharmacists, schools of medicine and pharmacy, and by certain government services. The convention, meeting once every ten years, selects a Committee of Revision to make desired changes in the Pharmacœpia then in force and to issue a new one. It is to aid this committee, to be selected by the convention which will meet in Washington next May, that the present questionnaire has been sent out. The next U. S. Pharmacœpia will be the eleventh. There is also a British Pharmacœpia.

Science News-Letter, November 16, 1929

Muscles Aid Singers

Physiology—Music

Team work between two sets of muscles, automatically provided for by nature, may be of advantage to singers, E. M. Josephson and Minnie K. Willens have found.

The powerful muscles of the human breathing apparatus work in cooperation with the very delicate muscles of the voice apparatus. The biggest range and best tonal quality may be obtained with least effort and fatigue by taking advantage of this natural cooperation.

Instead of using only one type of breathing, involving only part of the breathing muscles, singers should vary the types of breathing according to the range of the notes they are singing. For higher tones Mr. Josephson recommends chest breathing, for the middle register or intermediate tones he advises costo-diaphragmatic breathing, and for lower tones abdominal breathing. The costo-diaphragmatic type is the single one now generally taught, Mr. Josephson stated. The method which he advises reduces to a minimum the strain on the voice muscles.

"Moreover, singing in this manner results in improvement of tonal range and quality and of vocal resonance," said Mr. Josephson.

Science News-Letter, November 16, 1929

CLASSICS OF SCIENCE: The Calculus of Probabilities

Mathematics

The tenth principle gives you the opportunity of applying the budget system to gambling, but the results are discouraging. Thus if you stake your hundred francs, fifty francs at a time, you have the chance, if you are lucky both times, of coming out with 300 francs, but you have also the chance of breaking even or of going broke. And the latter events are more apt to happen.

PART TWO

A PHILISOPHICAL ESSAY ON PROBABILITIES. By Pierre Simon, Marquis de Laplace. Translated from the sixth French edition by Frederick Wilson Truscott and Frederick Lincoln Emory. New York: 1902.

Concerning Hope

The probability of events serves to determine the hope or the fear of persons interested in their existence. The word *hope* has various acceptations; it expresses generally the advantage of that one who expects a certain benefit in suppositions which are only probable. This advantage in the theory of chance is a product of the sum hoped for by the probability of obtaining it; it is the partial sum which ought to result when we do not wish to run the risks of the event in supposing that the division is made proportional to the probabilities. This division is the only equitable one when all strange circumstances are eliminated; because an equal degree of probability gives an equal right to the sum hoped for. We will call this advantage *mathematical hope.*

Eighth Principle.—When the advantage depends on several events it is obtained by taking the sum of the products of the probability of each event by the benefit attached to its occurrence.

Let us apply this principle to some examples. Let us suppose that at the play of heads and tails Paul receives two francs if he throws heads at the first throw and five francs if he throws it only at the second. Multiplying two francs by the probability ½ of the first case, and five francs by the probability ¼ of the second case, the sum of the products, or two and a quarter francs, will be Paul's advantage. It is the sum which he ought to give in advance to that one who has given him this advantage; for, in order to maintain the equality of the play, the throw ought to be equal to the advantage which it procures.

If Paul receives two francs by throwing heads at the first and five francs for throwing it at the second throw, whether he has thrown it or not at the first, the probability of throwing heads at the second throw being ½, multiplying two francs and five francs by ½ the sum of these products will give three and one half francs for Paul's advantage and consequently for his stake at the game.

A GAMBLER WHO DID NOT RECKON ON PROBABILITIES, from Hogarth's "Rake's Progress." Hogarth was 52 years older than Laplace, and died when the mathematician was 15 years old

Ninth Principle.—In a series of probable events of which the ones produce a benefit and the others a loss, we shall have the advantage which results from it by making a sum of the products of the probability of each favorable event by the benefit which it procures, and subtracting from this sum that of the products of the probability of each unfavorable event by the loss which is attached to it. If the second sum is greater than the first, the benefit becomes a loss and hope is changed to fear.

Consequently we ought always in the conduct of life to make the product of the benefit hoped for, by its probability, at least equal to the similar product relative to the loss. But it is necessary, in order to attain this, to appreciate exactly the advantages, the losses, and their respective probabilities. For this a great accuracy of mind, a delicate judgment, and a great experience in affairs is necessary; it is necessary to know how to guard one's self against prejudices, illusions of fear or hope, and erroneous ideas, ideas of fortune and happiness, with which the majority of people feed their self-love.

The application of the preceding principles to the following question has greatly exercised the geometricians. Paul plays at heads and tails with the condition of receiving two francs if he throws heads at the first throw, four francs if he throws it only at the second throw, eight francs if he throws it only at the third, and so on. His stake at the play ought to be, according to the eighth principle, equal to the number of throws, so that if the game continues to infinity the stake ought to be infinite. However, no reasonable man would wish to risk at this game even a small sum, for example five francs. Whence comes this difference between the result of calculation and the indication of common sense? We soon recognize that it amounts to this: that the moral advantage which a benefit procures for us is not proportional to this benefit and that it depends upon a thousand (*Turn to next page*)

Probabilities—*Continued*

circumstances, often very difficult to define, but of which the most general and most important is that of fortune.

Indeed it is apparent that one franc has much greater value for him who possesses only a hundred than for a millionaire. We ought then to distinguish in the hoped-for benefit its absolute from its relative value. But the latter is regulated by the motives which make it desirable, whereas the first is independent of them. The general principle for appreciating this relative value cannot be given, but here is one proposed by Daniel Bernoulli which will serve in many cases.

Tenth Principle.—The relative value of an infinitely small sum is equal to its absolute value divided by the total benefit of the person interested. This supposes that every one has a certain benefit whose value can never be estimated as zero. Indeed even that one who possesses nothing always gives to the product of his labor and to his hopes a value at least equal to that which is absolutely necessary to sustain him.

If we apply analysis to the principle just propounded, we obtain the following rule: Let us designate by unity the part of the fortune of an individual, independent of his expectations. If we determine the different values that this fortune may have by virtue of these expectations and their probabilities, the product of these values raised respectively to the powers indicated by their probabilities will be the physical fortune which would procure for the individual the same moral advantage which he receives from the part of his fortune taken as unity and from his expectations; by subtracting unity from the product, the difference will be the increase of the physical fortune due to expectations: we will call this increase *moral hope*. It is easy to see that it coincides with mathematical hope when the fortune taken as unity becomes infinite in reference to the variations which it receives from the expectations. But when these variations are an appreciable part of this unity the two hopes may differ very materially among themselves.

This rule conduces to results conformable to the indications of common sense which can by this means be appreciated with some exactitude. Thus in the preceding question it is found that if the fortune of Paul is two hundred francs, he ought not reasonably to stake more than nine francs. The same rule leads us again to distribute the danger over several parts of a benefit expected rather than to expose the entire benefit to this danger. It results similarly that at the fairest game the loss is always greater than the gain. Let us suppose, for example, that a player having a fortune of one hundred francs risks fifty at the play of heads and tails; his fortune after his stake at the play will be reduced to eighty-seven francs, that is to say, this last sum would procure for the player the same moral advantage as the state of his fortune after the stake. The play is then disadvantageous even in the case where the stake is equal to the product of the sum hoped for, by its probability. We can judge by this of the immorality of games in which the sum hoped for is below this product. They subsist only by false reasonings and by the cupidity which they excite and which, leading the people to sacrifice their necessaries to chimercial hopes whose improbability they are not in condition to appreciate, are the source of an infinity of evils.

The disadvantage of games of chance, the advantage of not exposing to the same danger the whole benefit that is expected, and all the similar results indicated by common sense, subsist, whatever may be the function of the physical fortune which for each individual expresses his moral fortune. It is enough that the proportion of the increase of this function to the increase of the physical fortune diminishes in the measure that the latter increases.

Pierre Simon Marquis de Laplace (1749-1827) at the age of 18 gained the attention of d'Alembert by his mathematical genius. Most of his work was on problems in celestial mechanics. The results of his studies were written first in his *Exposition du Système du Monde*. At the age of 50 he published the first two volumes of his great *Méchanique Céleste*, following with the third and fourth in the next six years. The fifth volume did not appear until twenty years later. Advancement of the theory of probabilities was a by-product of his studies of planetary motions, and in other chapters of the interesting book from which this extract is taken, he goes into more detail on this and other practical phases of the subject.

Science News-Letter, November 16, 1929

A statistical study shows that about eighteen per cent. of the population are first-born members of their families.

Earthquakes have shaken Asia Minor approximately 10,000 times since the beginning of our era.

During the past five years more than 3,000,000 Europeans have sought homes in other countries.

Two hundred different American dialects have been recorded by phonograph on the campus of Columbia University.

Rome, Naples and Milan are striving for the honor of being the first Italian city to have 1,000,000 inhabitants.

Staff of Science Service—Acting Director, Vernon Kellogg; Managing Editor, Watson Davis; Staff Writers, Frank Thone, James Stokley, Emily C. Davis, Jane Stafford, Marjorie Van de Water; Librarian, Minna Gill; Sales and Advertising Manager, Hallie Jenkins.

Board of Trustees of Science Service—*Honorary President*, William E. Ritter, University of California. Representing the American Association for the Advancement of Science, J. McKeen Cattell, *President*, Editor, Science, Garrison, N. Y.; D. T. MacDougal, Director, Desert Laboratory, Tucson, Ariz.; Dr. Raymond Pearl, Director, Institute for Biological Research, Johns Hopkins University, Baltimore, Md. Representing the National Academy of Sciences, John C. Merriam, President, Carnegie Institute of Washington; R. A. Millikan, Director, Norman Bridge Laboratory of Physics, California Institute of Technology, Pasadena, California; David White, Senior Geologist, U. S. Geological Survey. Representing National Research Council, Vernon Kellogg, *Vice-President and Chairman of Executive Committee*, Permanent Secretary, National Research Council, Washington, D. C.; C. G. Abbot, Secretary, Smithsonian Institution, Washington, D. C.; Harrison E. Howe, Editor of Industrial and Engineering Chemistry. Representing Journalistic Profession, John H. Finley, Associate Editor, New York Times; Mark Sullivan, Writer, Washington, D. C.; Marlen E. Pew, Editor of Editor and Publisher, New York City. Representing E. W. Scripps Estate, Harry L. Smithon, *Treasurer*, Cincinnati, Ohio; Robert P. Scripps, Scripps-Howard Newspapers, West Chester, Ohio; Thomas L. Sidlo, Cleveland, Ohio.

Unusual

CHRISTMAS CARDS

Printed on thin sections of various woods, showing beauty of natural color and structure

Send $1.00 for set of 6, all different

ROMEYN B. HOUGH CO.

Publishers

"Handbook of Trees" "American Woods"

LOWVILLE, N. Y.

Florida Cypress Over 2,000 Years Old

Botany

A giant cypress with a trunk over fifteen feet in diameter may be Florida's rival to the big trees of California for the recognition as America's oldest living tree. Prof. Herman Kurz, of the Florida State College for Women, has made a study of the gnarled and battered veteran, and estimates that it may be 2,000 years or more old. It may be as much as 2,800 years old, he thinks.

If this does not exceed the age of the great trees that are the pride of California, it is at least a highly respectable antiquity, and Prof. Kurz feels that Floridians owe it to themselves to call public attention to the picturesque grandeur of their remaining groves of big cypresses, and at the same time insure their protection against thoughtless vandalism.

Before studying the big tree, Prof. Kurz examined the stumps of a number of recently felled seven- and eight-foot specimens. One sample seven-footer proved by its ring count to be about 700 years old. It was, therefore, already a veteran when Ponde de Leon discovered Florida, and was a lusty young tree even when Chaucer wrote the Canterbury tales.

Commenting on the fifteen-foot giant, Prof. Kurz said:

"The stubby top and relatively short trunk hark back to many and ancient violences. Some time before Christ, this tree, probably solid and sound, had already attained a diameter of several feet. Then the pesky cypress gungus gnawed into its heart wood; maybe it was when Cicero orated for the cause of Rome. A hollow and weak trunk ensued. Next a violent storm wrenched off a large limb or two, so that the tree became stunted in appearance and growth. Just when the limbs crashed is also a conjecture. It could have happened when Caesar was in Gaul (55 B. C.) or during the time of Constantine, about 300 A. D. During the Norman Conquests or the Crusades it may have suffered the loss of another limb or two."

After surviving all these damages and dangers, the great tree is now in real peril. And ironically enough, its life is threatened by mere penknives. Thoughtless tourists by the hundred inscribe their initials and more or less silly sentiments in its trunk, and these constant little wounds are endangering the life of the tree. Prof. Kurz advocates surrounding it with a high fence to protect it from its admirers; and he would also have Floridians undertake a campaign of public education designed to secure both a fuller appreciation of the interest and value of the big cypresses, and their preservation for future generations.

Science News-Letter, November 16, 1929

Identifies Liquor of Ancients

Archæology

When it comes to "sampling the evidence," one German scientist has American prohibition agents beaten. With nothing more before him than an Egyptian bottle that has been empty since 3300 B. C., Prof. Dr. Johannes Grüss of Berlin can tell whether the departed Pharaoh in whose tomb it was found liked his beer light or dark, whether he favored a brew made of barley or emmer, or whether his taste ran more daintily to wine. Fortunately for themselves and their subjects as well, distilled liquors were unknown to the kings of ancient Egypt.

It all turns on Prof. Grüss' expert knowledge of yeasts. There are many different species of these active microscopic plants that put the kick in home brew and raise the dough when the baker makes bread, and only a botanist specially trained in microscopic technique can tell them apart.

Prof. Grüss had a lot of ancient bottles and jugs which had been sent to him by an American scientist, Dr. H. E. Winlock of the Metropolitan Museum of Art in New York. They had been found in various ancient tombs, some of them dating back 1700 years beyond King Tut. They had been full of various fermented liquids for the refreshment of the late lamented on his long journey to Paradise when they were put away, but these, of course, had evaporated, leaving a deposit of dried yeast cells and other detritus on their sides and bottoms.

By microscopic examination of this material, the German scientist was able to tell what the Pharaoh's brewer had used to give his stuff the requisite authority. The special kind of beer could be determined from starch grains mixed with the yeast deposit, and wines were betrayed by the presence of characteristic acid crystals. That one batch of beer had gone sour was indicated by the finding of the skins of number of "vinegar eels."

Early Egyptian brewers and wine-makers were not at all fussy. Apparently, they didn't even take the trouble to strain the water they used; for Prof. Grüss has found, mixed with his yeast cells, such things as tiny twigs and leaf fragments, bits of water weeds from the Nile, and wings, legs and heads of insects of various kinds, to say nothing of appreciable amounts of desert dust.

About one thing, however, they were particular. They always used the same kind of yeast, and they apparently kept their cultures pure for over 2,000 years. The elaborate ceremonies of the Hebrew purging and renewal of the leaven at Pesach give a hint of how yeast may have ben cared for in old Egypt.

Prof. Grüss identifies the old Egyptian yeast as a wild species that lives on certain fruits, though he regards it as more likely that it went into the Egyptian "makings" with honey that was added to the batch as sugar is added by present-day home brewers. He regards it as a new species of *Saccharomyces,* the genus to which all yeasts belong, and in honor of the American who supplied him with his ancient bottles he has named the yeast *Saccharomyces Winlocki.*

Science News-Letter, November 16, 1929

Big Gorilla Killed

Zoology

The killing of a huge male gorilla has been reported to Dr. Henry Fairfield Osborn, president of the American Museum of Natural History, in a letter from Dr. William K. Gregory, of the expedition sent by Columbia University and the Museum to study and photograph gorillas and other great apes in Africa. The animal was killed by H. C. Raven, leader of the party. After it had made a couple of "fake charges" it came straight at the explorers, and Mr. Raven shot it in the face.

The expedition expects to secure a second gorilla, after which the photographic work will begin. Dr. Gregory reports that owing to the density of the bush it will be extremely difficult to obtain good pictures.

Science News-Letter, November 16, 1929

P. BLAKISTON'S SON & CO. INC. Publishers 1012 Walnut St. PHILADELPHIA

HACKH'S Chemical Dictionary

THE great progress of chemistry in recent years and its resulting, intensified specialization has emphasized the need for a dictionary which records the old and new phenomena in the terms of *our new concepts of matter and energy.*

This book is planned on broad lines. It is not a mere compilation or collection of facts, but it restates and redefines in simple, modern terms, the phenomena of the science, and connects these phenomena with each other. The author provides a number of original charts and diagrams which give a clearer conception of the subject and will prove of great practical value.

The work is offered as a modern clear and concise description of the theories, laws and rules; elements, compounds, minerals, drugs, vegetable and animal products; reactions, processes, methods; apparatus, equipment, instruments, and biographical data with portraits. The collateral vocabulary of physics, astrophysics, geology, mineralogy, botany, zoology, medicine and pharmacy, also industry, mining and commerce has been included in so far as these terms are pertinent to the field of chemistry.

During the preparation of the work, the author received important information from a number of eminent chemists and scientists. The entire manuscript has been reviewed by Dr. Julius Grant, M.Sc., F.I.C., of London who, by embodying numerous terms which reflect British usage, has given the book an international character.

By INGO W. D. HACKH

Professor of Chemistry, College of Physicians and Surgeons, San Francisco: Author of "Chemical Reactions and Their Equations"

The Volume Bound in Handsome, Durable Fabricoid, Large Octavo (6¾ x 9¾) 790 Pages, 232 Illustrations, Over 100 Tables. $10.00.

P. BLAKISTON'S SON & CO. INC. Publishers 1012 Walnut St. PHILADELPHIA

FIRST GLANCES AT NEW BOOKS

INTERNATIONAL CRITICAL TABLES OF NUMERICAL DATA, PHYSICS, CHEMISTRY AND TECHNOLOGY (VOL. VI)—National Research Council—*McGraw-Hill* ($12). The compilation of the International Critical Tables, under the auspices of the International Research Council and the National Academy of Sciences, has been a major undertaking in the preservation and distribution of the fundamental constants of science. Volume VI, the next to the last, contains X-ray data, electronic and gas conduction, dielectric properties, electrical conductivity and resistivity, pyro and piezo-electricity, thermoelectricity, transference numbers of electrolytes in aqueous solution, electrolytic electromotive force, electrical and optical properties of SiO_2, magnetism, atmospheric electricity, terrestrial magnetism, acoustics.

General Science
Science News-Letter, November 16, 1929

THE ELECTROMAGNETIC FIELD—Max Mason and Warren Weaver—*University of Chicago Press* ($6). A technical introduction to the mathematical field theory of electrodynamics which, the introduction says "is written in an attempt to keep clear the relation between the mathematical mechanism and the physical reality." The authors say further: "It is hoped that a student who gains his familiarity with the Maxwell field equations from this book will have an open mind, ready to evaluate without prejudice those fundamental new developments in electrical theory which are bound to come."

Physics
Science News-Letter, November 16, 1929

SOUND MOTION PICTURES—Harold B. Franklin—*Doubleday, Doran* ($3). With every new industry there grows its own literature. The aim of this book is to present a condensed record of the progress of "sound" in motion pictures. The author, who is president of the Fox West Coast Theatres, has aimed this volume at the public and those interested professionally in the talkies.

Physics—Photography
Science News-Letter, November 16, 1929

PRINCIPLES OF CHEMISTRY—J. H. Roe—*Mosby* ($2.50). The second edition of a textbook by the professor of chemistry at the George Washington University Medical School.

Chemistry
Science News-Letter, November 16, 1929

ENDS OF THE EARTH—Roy Chapman Andrews—*Putnam* ($4.50). Long before he started on the trail of ancient man in Mongolia, Mr. Andrews had begun having adventures. His pursuit of whales and the big game of Asia, and at length the quest of ancient man, led him to strange places and into exciting and amusing encounters with men and beasts. While he was on his most recent Gobi Desert expedition this book was written, on trains and ships and airplanes. The author seems to think this a handicap, but judging by the delightful, informal style of his book, an expedition journey is just the time to reminisce about other expeditions.

Exploration
Science News-Letter, November 16, 1929

NATIONALITY, ITS NATURE AND PROBLEMS — Bernard Joseph — *Yale University Press* ($3). The phenomenon of nationality is one peculiarly interesting to scientist and those interested in science. The acquisition of new knowledge and the spread of knowledge obtained through research is truly international in its effect upon the world but boundary lines and political divisions and sentiments do often influence the progress of science.

Political Geography—Psychology
Science News-Letter, November 16, 1929

THE NATIONALIST PROGRAM FOR CHINA—Chao-Chu Wu—*Yale University Press* ($1.50). Aside from the political aspects of new China, the policies of the nationalistic government are of direct interest to scientists because of their possible effect upon the progress of scientific research, both native and foreign, in China and its wide area. This is an authoritative statement by the minister from China to the United States.

Political Geography
Science News-Letter, November 16, 1929

THE PACIFIC AREA—George H. Blakeslee—*World Peace Foundation* ($2). There is extreme timeliness in this summary by a Clark University professor of the situation in the Far East today. The political and military skirmishes in Manchuria can be better understood after reading portions of this volume.

Political Geography
Science News-Letter, November 16, 1929

THE WORLD'S GRASSES—J. W. Bews—*Longmans* ($7.50). The average young botanist is perhaps more afraid of the grasses than he is of any other group of vascular plants. They really aren't so dreadful, systematically speaking; but they have somehow got themselves a terrifying reputation. For this cause alone, any addition to the literature that facilitates working with grasses will be welcomed by the botanical profession. Add to it Prof. Bews' high standing in taxonomy, and his long residence in South Africa, one of the world's most interesting grassland areas, and you have compelling causes for adding this work to any botanical bookshelf. Ecological and economic notes, and a key that looks as though it would really work, add further to the value of the book.

Botany
Science News-Letter, November 16, 1929

BOTANY: PRINCIPLES AND PROBLEMS—E. W. Sinnott—*McGraw-Hill* ($3). A second edition of a comprehensive and well-arranged botanical textbook that has already justified its existence.

Botany
Science News-Letter, November 16, 1929

STUDIES OF AMERICAN PLANTS, I and II—Paul C. Standley—*Field Museum Publ. 264.* Chiefly descriptions of new species of Mexican and Central American plants; of interest to systematists.

Botany
Science News-Letter, November 16, 1929

FISHES—N. A. Borodin—*Bull. Vanderbilt Marine Mus., Vol. I, Art. 1.* This, the first item in a new series of scientific publications, concerns itself with material collected on the expedition of the yacht "Ara" during the years 1926 to 1928, while in command of William K. Vanderbilt.

Ichthyology
Science News-Letter, November 16, 1929

NOTES ON HOPI CLANS—Robert H. Lowie—*American Museum of Natural History* (50c). A study of the clan organization in four Indian villages, showing the size of the clans, the marriages and relationships, and the social and ceremonial aspects.

Ethnology
Science News-Letter, November 16, 1929

HOPI KINSHIP—Robert E. Lowie—*American Museum of Natural History* (35c). Discusses principally the influence of the clan upon linguistics.

Ethnology
Science News-Letter, November 16, 1929

First Glances at New Books—*Continued*

THE SOVIET UNION LOOKS AHEAD—U. S. S. R. State Planning Commission—*Horace Liveright* ($2.50). When the Soviet Union, large of area although small in age and out of step politically with much of the rest of the world, outlines its economic plans for the next five years, there must be included in them many things of interest to those interested in the application of science to industry. Development of electric power, fuel, metal industry and machine construction, chemical production, forestry, production of building materials, and many other activities firmly resting upon applied science are contained in the Soviet's five-year plan.

Sociology
Science News-Letter, November 16, 1929

THE STORY OF GOVERNMENT—Sir Charles Petrie—*Little, Brown* ($3.50). This history of the forms which various people have set up to regulate their national conduct is written by an English authority. It deals largely with the main stream of progress which has led to those forms of polity that are established everywhere in Europe and America today.

Sociology
Science News-Letter, November 16, 1929

JOY IN WORK—Henri de Man—*Henry Holt* ($2). Why we sing or grumble at our work was the subject of a German investigation here presented in translation. It is a contribution to the new psychology of industrial employment.

Psychology—Sociology
Science News-Letter, November 16, 1929

YOUTHFUL OLD AGE—Walter M. Gallichan—*Macmillan* ($2.50). This book purports to be advice for older persons on how to live so as to get the most out of the later years of life. Some of the author's theories are not in accord with present medical opinion. The purpose of the book is admirable, but after all, it would seem that a physician is the person best qualified to advise aged as well as young persons on how to live happily and healthily.

Hygiene
Science News-Letter, November 16, 1929

THE CHEMISTRY OF LEATHER MANUFACTURE—John Arthur Wilson—*Chemical Catalog Co.* ($10). The second edition of the second volume of a monumental work on leather. This is one of the American Chemical Society Monographs.

Chemistry
Science News-Letter, November 16, 1929

GEOLOGIC STRUCTURES—Bailey Willis and Robin Willis—*McGraw-Hill* ($4). A second edition, revised and enlarged, of a book on geologic structures under the senior authorship of the dean of American structural geologists. Both text and diagrammatic illustrations are masterpieces of straightforwardness and clarity in presentation.

Geology
Science News-Letter, November 16, 1929

THE FUTURE OF THE EARTH—Harold Jeffreys—*Norton* ($1). A little book that contains as many disquieting prophecies as some of the little books in the middle of the Bible. Only the author here writes from a coldly accurate knowledge of past cosmogony and argues therefrom what the earth may yet be expected to do.

Geology
Science News-Letter, November 16, 1929

THE EVOLUTION OF EARTH AND MAN—Edited by G. A. Baitsell—*Yale University Press* ($5). This is a noteworthy addition to the growing literature of symposia on the earth and the things that therein are. Its list of authors includes twelve of the foremost members of the Yale faculty, men with international reputations, whose words can be accepted as sound and solid in their several fields.

General Science
Science News-Letter, November 16, 1929

THE LAND MAMMALS OF URUGUAY—C. C. Sanborn—*Field Museum Publ. 265.* Of interest to systematic zoologists and students of animal distribution.

Zoology
Science News-Letter, November 16, 1929

BIRDS OF THE JAMES SIMPSON-ROOSEVELTS ASIATIC EXPEDITION—C. E. Hellmayr—*Field Museum Publ. 263.* An amply annotated check-list of the birds brought back from little visited regions by an unusually well-organized expedition.

Ornithology
Science News-Letter, November 16, 1929

THE WORLD SUGAR SITUATION—*League of Nations, Economic Committee* (25c). That Australia has the largest per capita sugar consumption, greater than that of the United States, is one of the interesting facts revealed in this pamphlet.

Economics
Science News-Letter, November 16, 1929

RAYON AND OTHER SYNTHETIC FIBERS—W. D. Darby—*Textile Publshing Co.* ($1.50). In 1923 the National Retail Dry Goods Association selected and sponsored the word "rayon" as the generic name for all synthetic fibers previously called artificial silk. The rayon industry has grown tremendously in the years since its christening and its history is told in this small volume prepared primarily for manufacturers and retailers.

Chemistry—Economics
Science News-Letter, November 16, 1929

TIN—C. L. Mantell—*Chemical Catalog Co.* ($7). The American Chemical Society Monographs are among the most useful of science books today. Within this volume is brought together much of the present day knowledge of an important metal which the United States sadly lacks within its own soil.

Metallurgy—Chemistry
Science News-Letter, November 16, 1929

CEMENT—Henry W. Nichols—*Field Museum of Natural History* (25c). Intended to explain exhibits of the Field Museum of Natural History, this leaflet is a brief description of the history, manufacture and use of cement.

Materials
Science News-Letter, November 16, 1929

BEGINNINGS OF TELEPHONY—Frederick L. Rhodes—*Harpers* ($4). This comprehensive history of the rise of the telephone to the status of a necessity is comprehensive yet readable. Legal details and court decisions are quoted along with the more scientific and technical developments which from Bell's initial invention until the turn of the century constituted the founding of a great industry and public service.

Electrical Engineering
Science News-Letter, November 16, 1929

IDOLS BEHIND ALTARS—Anita Brenner—*Payson and Clarke* ($5). A colorful and sympathetic interpretation of Mexico's people, the celebrities that we read of in the press, the revolutionists, the Indian natives, the artists—particularly the artists. Art is given special attention for the author believes that art is organically a part of life in Mexico and also that "only as artists can Mexicans be intelligible." The book stresses underlying causes and origins, showing the influence of the old, native idols behind the modern imported altars.

Ethnology
Science News-Letter, November 16, 1929